Patent Claims

1. Parametric equalizer comprising

filtering means (FM), user interface means (UIM), audio signal input means and
audio signal output means,

said filtering means comprising at least one filter block (FIB)

said user interface means (UIM) comprising means for adjustment of parameters:
corner frequency (fc), shape (Q) and gain (G),

said parametric equalizer comprising means for establishing a variable magnitude
response symmetry of said at least one filter block (FIB).

2. Parametric equalizer according to claim 1, wherein

said user interface means (UIM) comprises a further symmetry adjustment parameter
(SYM) for establishing a variable symmetry of the magnitude response of said at
least one filter block (FIB),

said user interface means is mapped by means of coefficient adjustment algorithms
into filter coefficient settings (FCS) of the at least one filter block (FIB), which when
established reflects the adjustment of the user interface means (UIM)

said further adjustment parameter (SYM) provides a filter coefficient setting (FCS)
comprising a combined adjustment of at least one zero frequency, pole frequency,
zero Q and pole Q of the magnitude response of said at least one filter block.

3. Parametric equalizer according to claim 1 or 2, wherein

said user control means facilitates adjustment of corner frequency (fc), Shape (Q), gain and symmetry.

4. Parametric equalizer according to any of claims 1-3, wherein said filter coefficient settings (FCS) comprise digital coefficients.

5. Parametric equalizer according to any of the claims 1-4, wherein said filter coefficient settings (FCS) comprise analogue values established by means of adjustable or selectable filter components of said at least one filtering means.

6. Parametric equalizer according to any of the claims 1-5, wherein said filtering means comprises less than twenty individually adjustable filter blocks (FIB), preferably less that ten and most preferably less than six.

7. Parametric equalizer according to any of the claims 1-6, wherein at least one of said filtering blocks comprise a biquatic filter.

8. Parametric equalizer according to any of the claims 1-7, wherein said parametric equalizer comprises at least one, preferably at least three cascaded biquadratic filters blocks (FIB) .

9. Parametric equalizer according to any of the claims 1-8, wherein said filtering means is analogously implemented.

10. Parametric equalizer according to any of the claims 1-9, wherein said filtering means is digitally implemented.

11. Parametric equalizer according to any of the claims 1-10, wherein said filtering means comprises gain compensation means adapted for compensation of alteration of the filtering block gain invoked by a changed setting of the further adjustment parameter.

12. Parametric equalizer according to any of the claims 1-11, wherein said filtering means comprises corner frequency compensation means adapted for compensation of alteration of the corner frequency of the filtering block invoked by a
5   changed setting of the further adjustment parameter.

13. Parametric equalizer according to any of the claims 1-12, wherein said user interface provides at least four different asymmetries of filter setting at least in part of the frequency range.
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14. Parametric equalizer according to any of the claims 1-13, wherein said further adjustment parameter (SYM) enables the user to gradually transform the filter block (FIB) between a low-shelf and a high-shelf filter characteristic.

15   15. Parametric equalizer according to any of the claims 1-13, wherein said further adjustment parameter (SYM) enables the user to gradually transform the filter block (FIB) from a low-shelf into a bell-shape and further into a high-shelf, thus defining at least one more than said three standard filter types.

20   16. Parametric equalizer according to any of the claims 1-15, wherein the number of said adjustment parameters corresponds the number of non-trivial degrees of freedom of the at least one filter block (FIB).

17. Parametric equalizer according to any of the claims 1-16, wherein the number of
25   said adjustment parameters is at least the number of non-trivial degrees of freedom of the at least biquad filter block (FIB) times the number of filter blocks (FIB) of said filtering means.

18. Parametric equalizer according to any of the claims 1-17, wherein the number of
30   non-trivial degrees of freedom of each of a number of cascaded filter block is at least four.

19. Parametric equalizer according to any of the claims 1-18, wherein the symmetry parameter may be set by means of the user interface to at least four different values, preferably a continuos interval of values in the digital or analog embodiment.

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20. Parametric equalizer according to any of the claims 1-19, wherein the adjustment parameters are converted into filter coefficient settings (FCS) triggered by the setting of the adjustment parameters by the user.

10   21. Parametric equalizer according to any of the claims 1-20, wherein the conversion of adjustment parameters into filter coefficient settings is invertible.

22. Parametric equalizer according to any of the claims 1-21, wherein
NDOFpar ≥ NDOFcoef,

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where NDOFpar is the number of adjustable equalizer parameters and NDOFcoef is the number of non-trivial degrees of freedom (fc, G, Q, Sym).

23. Parametric equalizer according to any of the claims 1-22, wherein given filter
20   coefficient settings may be converted into corresponding adjustment parameters.

24. Method of adjusting the filter coefficients of the filter of a parametric equalizer comprising the step of availing user adjustment of all the degrees of freedom of the transfer function or a block of the transfer function of the filter.

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25. Method of adjusting the filter coefficients according to claim 24, whereby said availing of user adjustment comprises the steps of adjusting four degrees of freedom per filter block (FIB).

26. Method of adjusting the filter coefficients according to claim 24-25, whereby said method is implemented in a parametric equalizer according to any of claims 1-22.